CLAIMS

What is claimed is:

1. A chuck for a plasma processor, said chuck comprising:

a temperature controlled base;

a thermal insulator disposed on top of said base, said thermal insulator having a thermal conductivity of less than about 1W/mK;

a flat support for holding a workpiece, said flat support disposed on top of said thermal insulator; and

a heater embedded within said flat support.

2. The chuck according to claim 1, further comprising a thermal conductor disposed between said flat support and said workpiece.

3. The chuck according to claim 1, wherein said thermal conductor further comprises a helium gas.

4. The chuck according to claim 1 wherein said thermal insulator further comprises a polymer.

5. The chuck according to claim 1 wherein said heater further comprises a plurality of planar heating elements.

6. The chuck according to claim 5 wherein said plurality of planar heating elements forms a plurality of heating zones.

7. The chuck according to claim 5 wherein the power of each of said planar heating elements is controlled independently.

8. The chuck according to claim 7 further comprising a sensor for each of said heating zones, said sensor measuring and sending a signal representative of the temperature for each of said heating zones.

9. The chuck according to claim 8 further comprising a controller for receiving said signal from said sensor and for adjusting the power of each of said planar heating elements based on a set point for each of said heating zones.

10. The chuck according to claim 1 wherein said heater is formed with etched foil technology.

11. The chuck according to claim 1 wherein said flat support further comprises a high temperature non-electrically conductive material.

12. A chuck for a plasma processor, said chuck comprising:

a temperature controlled base;

a thermal insulator disposed on top of said base, said thermal insulator having a low thermal conductivity of less than about 1W/mK;

a flat support for holding a workpiece, said flat support disposed on top of said thermal insulator; and

a heater disposed between said thermal insulator and said flat support.

13. The chuck according to claim 12, further comprising a thermal conductor disposed between said flat support and said workpiece.

14. The chuck according to claim 13 wherein said thermal conductor further comprises a helium gas.

15. The chuck according to claim 12 wherein said thermal insulator further comprises a polymer.

16. The chuck according to claim 12 wherein said heater further comprises a plurality of planar heating elements forming a plurality of heating zones.

17. The chuck according to claim 16 wherein the power of each of said planar heating elements is controlled independently;

18. The chuck according to claim 17 further comprising a sensor for each of said heating zone, said sensor measuring and sending a signal representative of the temperature for each of said heating zone.

19. The chuck according to claim 18 further comprising a controller for receiving said signal from said sensor and adjusting the power of each of said planar heating elements based on a set point for each of said heating zone.

20. The chuck according to claim 12 wherein said heater is formed with etched foil technology.

21. The chuck according to claim 12 wherein said flat support further comprises a high temperature non-electrically conductive material.

22. An apparatus for controlling the temperature distribution across a workpiece, said apparatus comprising:

a temperature controlled base;

a first interface disposed on top of said base;

a thermal insulator disposed on top of said first interface, said thermal insulator having a thermal conductivity of less than 1W/mK;

a heater embedded within said thermal insulator;

a second interface disposed on top of said thermal insulator; and

a flat support for holding the workpiece disposed on top of said second interface.

23. The apparatus according to claim 22 further comprising a thermal conductor disposed between said flat support and the workpiece.

24. The apparatus according to claim 23 wherein said thermal conductor further comprises a helium gas.

25. The apparatus according to claim 22 wherein said first interface and said second interface further comprise a polymer.

26. The apparatus according to claim 38 wherein said thermal insulator further comprises a high temperature non-electrically conductive material.

27. The apparatus according to claim 22 wherein said heater further comprises a plurality of planar heating elements defining a plurality of heating zones.

28. The apparatus according to claim 27 wherein the power of each of said planar heating elements is controlled independently.

29. The apparatus according to claim 28, further comprising a sensor for each of said heating zones, said sensor measuring and sending a signal representative of the temperature for each of said heating zones.

30. The apparatus according to claim 29, further comprising a controller for receiving said signal from said sensor and adjusting the power of each of said planar heating elements based on a set point for each of said heating zones.

31. The apparatus according to claim 22 wherein said heater is formed with etched foil technology.

32. The apparatus according to claim 22 wherein said flat support further comprises a high temperature non-electrically conductive material.

33. A method for controlling the temperature across a workpiece profile having multiple zones, said method comprising:

providing a base maintained at a constant temperature, said constant temperature being below the temperature of the workpiece, said base having a thermal insulator mounted on top of said base;

holding the workpiece against a top face of a workpiece holder, said workpiece holder mounted on top of said thermal insulator; and

heating each zone of the workpiece independently with a heater disposed within said workpiece holder.

34. The method according to claim 33 further comprising monitoring the temperature of the multiple zones with a sensor in each zone.

35. The method according to claim 34 further comprising adjusting the temperature of each zone based on said monitoring.

36. An apparatus for controlling the temperature across a workpiece profile having multiple zones, said apparatus comprising:

means for maintaining a base at a constant temperature, said constant temperature being below the temperature of the workpiece, said base having a thermal insulator mounted on top of said base;

means for holding the workpiece against a top face of a workpiece holder, said workpiece holder mounted on topof said thermal insulator; and

means for independently heating each zone of the workpiece with a heater disposed within said workpiece holder.

37. The apparatus according to claim 36 further comprising means for monitoring the temperature of the multiple zones with a sensor in each zone.

38. The apparatus according to claim 37 further comprising means for adjusting the temperature of each zone based on said monitoring.